



IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL  
QUALITY

1410 North Hilton  
Boise, ID 83706  
(208) 373-0502

[www2.state.id.us/deq](http://www2.state.id.us/deq)

## Nitrate and Ground Water

### What is nitrate?

Nitrate is a form of nitrogen, an element whose compounds are vital components of foods and fertilizers. It is tasteless, odorless, and colorless and comes from various sources such as plants and other organic matter, which return nitrate to the soil as they decompose. Septic sewer systems, waste from animal feedlots, and the application of nitrogen-based fertilizers also discharge nitrates to the environment. Fertilizers can be animal manures, human wastes, composts, and sewage sludge as well as manufactured fertilizers made of nitrogen and ammonium. Ammonium not utilized by plants may also be converted to nitrate.

### What happens to nitrate when it gets into the environment?

Nitrate that is not used by plants for growth can build up in and move through soil. Precipitation, irrigation, and sandy soils allow nitrate to move around and find its way into surface water and ground water.

### Why is nitrate in ground water a concern?

Ground water supplies 95% of the water used in Idaho households and provides drinking water to more than 200 Idaho cities and towns. High levels of nitrate in drinking water are associated with adverse health effects.

### How can nitrate affect my health or my child's health?

People may be exposed to nitrate in both food and water. In healthy adults and older children, ingested nitrate is excreted rapidly in the urine. Exposure to fairly large amounts of nitrate is not usually associated with short-term adverse effects. Infants younger than six months of age, however, are sensitive to nitrate poisoning, which may result in serious illness or death. The illness occurs when nitrate is converted to nitrite in a child's body. Nitrite reduces oxygen in the child's blood, causing shortness of breath and blueness of the skin, hence the name "blue baby syndrome." The technical term for this condition is "methemoglobinemia." This illness can cause a child's health to deteriorate rapidly over a period of days.

Other health effects—including cancer and problems with reproduction and development—may occur with long-term high exposure to nitrate. At this time, no hard evidence links nitrate to these harmful health effects, but research is ongoing.

### How is nitrate in ground water regulated?

The U.S. Environmental Protection Agency has established a federal drinking water standard, called a Maximum Contaminant Level (MCL) of 10 milligrams per liter (mg/L), or 10 parts per million (ppm) for nitrate. The Idaho ground water quality standard is also 10 mg/L. Public water systems are required to sample for various contaminants, including nitrate, on a regular basis. There is no required sampling of domestic or stock wells. However, DEQ recommends that owners test their wells for nitrate on a regular basis.

**How do I find out if my well is contaminated with nitrate?**

Nitrate is tasteless, odorless, and colorless. To find out if there is nitrate in your domestic or stock well water, have it tested by a laboratory certified for nitrate testing by the Idaho Division of Health. Laboratories will provide sampling bottles and instructions. Contact your local health department or look in the Yellow Pages under “Laboratories – Testing” or “Water Analysis” for a certified laboratory serving your area. It’s a good idea to have a routine nitrate test at least once a year. You should also have your water tested for nitrate if you are a woman planning on becoming pregnant or if infants will be using the water. If you are connected to a public water system, refer to that system’s Consumer Confidence Report for the nitrate level in your drinking water. The contact information for your local water system should appear on your water bill, or you can contact your regional DEQ office for that information.

**What if nitrate is found in my water?**

If the nitrate concentration exceeds the MCL of 10 mg/L, do not give the water to any infant under six months of age, either directly or in formula. Infants should be provided with water from a source that has been tested and shown to be low in nitrate. Commercially bottled water is required to meet the nitrate standard, and is fine for infants. Do not boil high-nitrate water to “treat” it. Although it is common to think of boiling, softening, or filtering as a means of purifying water, none of these methods reduce nitrate contamination. Boiling actually concentrates the nitrate due to evaporation of the water. Home water treatment units are not recommended for treating high-nitrate water that will be given to infants. There is no foolproof way of knowing when the treatment system may fail, and blue baby syndrome has been known to occur after just one day of exposure to high-nitrate water.

It’s a good idea to have the well inspected by a licensed well contractor if the well is old, or if you do not know whether it is structurally sound. Nitrate problems are sometimes caused by structural flaws, which allow contaminated surface water to enter the well. Repairing the well or constructing a new, deeper well often results in a significant reduction in the nitrate level. To find licensed well drillers in your area, look in the Yellow Pages under “Well Drilling and Service” or “Water Supply Systems.”

Identify and remove sources of nitrate near the well. Fertilizers, animal wastes, and sewage systems should be located and managed so that they do not contaminate the well. If a nitrate source is too close to the well and cannot be moved, then you may need hire a licensed well contractor to permanently seal and replace your well.

**Nitrate and livestock health**

Nitrate poisoning is most likely to occur in livestock animals such as cattle and sheep. Generally, high-nitrate water is only a concern when used with high-nitrate feeds. Water levels of 20 to 40 mg/L are considered safe for livestock unless feed is high in nitrate. Levels of 40 to 100 mg/L are not recommended for young livestock, and are only safe for mature livestock if feed is very low in nitrate. Levels of nitrate-nitrogen over 100 mg/L should not be used.

**Effect of nitrate of aquatic life**

Nitrate can enter surface water through surface runoff, or from nitrate in ground water that flows into surface water. Excess nitrogen in surface water, in combination with other plant nutrients such as phosphorous, can lead to excessive growth of algae and other aquatic plants; this can lead to decreased oxygen levels and harmful effects on aquatic life.

**For more Information**

Elke Shaw-Tulloch, Manager

Environmental Health Education and Assessment Program

450 W. State Street, 4<sup>th</sup> Floor

Boise, ID 83720-0036

Ph: (208) 334-0606 or toll-free: (866) 240-3553

Fx: (208) 334-6581

Email: [shawe@idhw.state.id.us](mailto:shawe@idhw.state.id.us)

**Idaho Department of Environmental Quality Regional Offices**

Boise Regional Office (208) 373-0550

Coeur d'Alene Regional Office (208) 769-1422

Idaho Falls Regional Office (208) 528-2650

Lewiston Regional Office (208) 799-4370

Pocatello Regional Office (208) 236-6160

Twin Falls Regional Office (208) 736-2190